the seventh and doubtless the definitive German edition. For those who have not been able to keep in touch with the rapid succession of German editions, it may be interesting to note that both in form and matter the new edition holds closely to the first. As compared with the second English edition, the present shows only two additions to the table of contents; and one of these merely emphasizes a division of the text already in existence. Thus those familiar with the earlier editions will find the relation between chapters, paragraphs and their subdivisions unchanged. Moreover, in the glossary of technical terms there is no change save that occasioned by the changes in German orthography and the substitution of *K* for the initial *C* in the words "Komplication" and "Kontrast."

The most conspicuous change in plan between the second and the third English editions is the introduction of some twenty odd figures and diagrams. They must be distinctly helpful to the student. As one might expect, they are wonderfully simple and effective. To the present reviewer at least they seem to lose something of their force by retaining the German words that occur within the figure. The translation below seems hardly to balance the possibility of initial discouragement by the unfamiliar designations.

In the text itself, in spite of the general similarity of arrangement and terminology, there are many minor changes and some marked ones. Most of these changes are simple revisions of the English phrase, or changes occasioned by some modification of the German phrase. Many of them consist of additional matter relating to the new cuts and figures. Some few of them, as for example the modification of the statement of the correlation between feeling and pulse (pp. 96–97), are concessions to criticism or indicate minor changes of attitude on the part of the author. Such changes, however, are rare.

English-speaking students are fortunate in possessing such a scholarly translation of the great psychologist's answer to the average student's needs.

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SOCIETIES AND ACADEMIES

THE AMERICAN CHEMICAL SOCIETY. NEW YORK SECTION

THE first regular meeting of the session of 1907–08 was held at the Chemists' Club, 108 West 55th Street, on October 11.

Dr. Hugo Schweitzer read an obituary of the late Durand Woodman, who has always taken an active interest in the work of the section. He was secretary and treasurer for several years and was a member of the executive committee when he died.

Mr. C. B. Zabriskie was elected to succeed Dr. Woodman on the executive committee.

The following papers were read:

Report on Toronto Meeting: M. T. BOGERT.

Some Transmutations of the Past Century: CHAS. BASKERVILLE.

Ignition Temperature of Gaseous Mixtures (Second Paper): K. G. FALK.

Discussion of Dr. Falk's Results with Reference to their Bearing upon Gas Engine Problems: C. E. LUCKE.

C. M. JOYCE,
Secretary.

THE AMERICAN PHILOSOPHICAL SOCIETY

AT the stated meeting held on October 18, the following paper was read:

The Growth of the Albino Rat as compared with the Growth of Man (with lantern illustrations): Professor HENRY H. DONALDSON.

SPECIAL ARTICLES

HEREDITY OF EYE-COLOR IN MAN

IT has been known that eye-color in man is inherited as an alternative character. Alternative inheritance is usually associated with Mendelism. Is human eye-color inherited in Mendelian fashion? The importance of knowing whether it is depends on the fact that, if Mendelian, the result of any combination of eye-colors of the parents upon the eye-color of the offspring can be, within certain limits, predicted.

The data on which this study has been made were collected with the assistance of school

principals and other friends. The records were made on blanks calling for the eye-color through three generations. The total number of cards—each giving the ancestry of one individual—is 132, of which 57 are single cards to a family while the remaining 75 are distributed in 20 families, an average of $3\frac{3}{4}$ children to a family.

Human eye-color falls into the main classes, blue and brown. The blue color of the iris is what is known as a structural color; no blue pigment is present, but there is a small quantity of scattered granules, reflection of the light from which gives a blue color exactly as reflection from suspended particles makes the air blue. The black pigment of the choroid coat gives a background that favors the reflection of light and prevents transmission; in albinos, who have no black choroid coat at the retina, light is reflected from the back of the eye and the iris appears reddish by transmitted light even as the sky is red at sunset. Brown eyes, on the contrary, contain melanic pigment, reflection from which yields black. Thus the blue eye is the absence of pigment. In addition to the two fundamental types we have black eyes, due to a greater quantity of pigment, and light (*i. e.*, dilute) brown eyes. In addition to black pigment the iris frequently contains more or less yellow in specks or patches. This is doubtless a fat-pigment or lipochrome. The combination of black and yellow pigment gives a green color as it does in the green canary, and such green and blue eyes are commonly called "gray." But "gray" is also used for blue eyes with some brown pigment in larger or smaller patches.

The nomenclature of eye-color which collaborators were requested to employ was as follows: Light blue, dark blue, blue-green or gray, hazel or dark gray, light brown, brown, dark brown, very dark brown or black. This nomenclature was generally followed and seemed to be understood except in the case of "hazel," which we suspect was employed in certain dark bluish-grays. The classification was probably too detailed and the three groups of blue, gray and brown would doubtless have sufficed. In the following summaries minor divisions of these three fundamental groups will frequently be neglected.

The first result which an analysis of the pedigree data reveals is that blue eye-color is recessive to brown. The first evidence of recessiveness is the purity of the germ cells of the recessive type, so that when two recessive individuals are mated *inter se* they throw only the recessive type. Of the offspring of two blue parents 69 are blue and 6 blue-gray or gray. Two additional cases of so-called "hazel" eyes we suspect to be of a blue type. Again, whenever in one family, both father and mother have blue eyes, all children have blue eyes. This is true in the Ge. and Sw. families of three children each, the Hur. family of 4 children and the Re. family of 6 children.

The second criterion of recessiveness is the absence of offspring of the recessive type from parents one of which is of the recessive type and the other a homozygous dominant. The only family that seems to meet the conditions of having a homozygous dominant brown parent is a small one (Sa_1) as follows:

Children	Parents	Grandparents
Boy, dark brown	light brown	brown
		brown
Girl, dark brown	blue	blue
		light blue

A third criterion is found in crosses of the R × DR type where a recessive is mated with a heterozygous dominant; in this case there should be an equal number of offspring of each type. Six matings of this sort give 16 dark-eyed to 9 light-eyed offspring—a deficiency of the light-eyed group which is probably due to the small numbers.

Since blue or absence of pigment is recessive we should expect to find some cases of two homogametous dominant browns which produce only brown-eyed offspring. We apparently have one such family (McB.) in which the four grandparents, two parents and five children have all dark brown eyes. The behavior of brown alone thus confirms that of browns when crossed with blues, and all results prove that black iris pigment is dominant over its absence.

Reference Letters	Children	Mother Father	Nature of Mating	Mother's Mother Father's Mother	Mother's Father Father's Father
Al.	1 Gray	Gray Blue	D × R	Br (gray?) Gray (blue?)	Gray Blue
Be.	5 Blue	Blue Blue	R × R	Dk Br (Blue?) Blue	Blue —
Br.	1 Blue 4 Gray	Gray (blue?) Blue	DR × R	Gray Gray (blue?)	Dk Br (blue?) Blue
Bu.	1 Gray	Blue Gray (blue)	R × DR	Gray (blue?) Blk (gray?)	Dk Br (blue?) Blue
Do.	4 Br	Blue Dk Br (blue)	R × DR	Blue Dr Br	Blue Blue
Ge.	3 Blue	Blue Blue	R × R	Blue Blue	Gray (blue?) Blue
He.	1 Gray	Blue Gray	R × D	Blue "Blue"	Blue "Blue"
Huf.	3 Blue	Blue Blue	R × R	Blue Blue	Blue Blue
Hur.	4 Blue	Blue Blue	R × R	Blue Br (blue?)	Blue Gray (blue?)
La.	3 Br 2 Blue	Br (blue) Gray (blue)	DR × DR	Blue Gray	"Gray"?? Blue
Lu.	1 Gray	Gray (blue) "Blue-gray"	R × R	Blue Blue	Gray Blue
Ma.	1 "Blue-gray"	Blue Blue	R × R	Blue —	Blue Blue
McB.	5 Dk Br	Dk Br Dk Br	D × D	Dk Br Dk Br	Dk Br Dk Br
McC.	1 Gray	Gray (blue) Blue	DR × R	Gray Blue	Blue "Blue-gray"
Mi.	2 Blue 4 Dk Br	Blue Dk Br (blue?)	DR × R	Gray (blue?) Dk Br	Blue Dk Br (blue?)
Oa.	6 Gray 2 Blue	Gray (blue?) Blue	DR × R	Gray Blue	— Blue
Re.	6 Blue	Blue Blue	R × R	Gray (blue?) Blue	Blue Blue
Ri.	1 Gray	Gray Br (blue)	DR × R	Br (gray?) Br	Gray Blue
Sa_1.	2 Dk Br	Br Blue	D × R	Br Blue	Br Blue
Sa_2.	3 Br 2 Blue	Blue Br (blue)	R × DR	Blue Dk Br	Blue Blue
Sa_3.	2 Br 3 Blue	Br (blue) "Gray"	DR × R	Blue Gray	"Gray" ?? Blk (blue?)
St.	1 Gray	Gray (blue) Gray	DR × R	Blue Gray	Gray Gray
Sw.	3 Blue	Blue Blue	R × R	Blue Blue	Blue Blue
Th.	1 Gray	Gray Blue	D × R	Gray Gray (blue?)	Gray Gray (blue?)

Reference Letters	Children	Mother Father	Nature of Mating	Mother's Mother Father's Mother	Mother's Father Father's Father
Va.	1 Gray	Gray (blue) Blue	DR × R	Br (gray?) Blue	Violet Blue
Vo.	1 Blue 2 Gray	Blue Gray (blue?)	DR × R	Br (blue?) Gray	Blue Br (blue?)
Wal.	1 Gray	Gray Blue	D × R	"Blue" Blue	"Blue" Blk (blue?)
War.	1 Blue 1 Br	Dk Br (blue) Blue	DR × R	Dk Br Blue	Blue Blue

Abbreviations: Br, brown; Dk Br, dark brown; Blk, black; D, dominant; DR, dominant and recessive (heterozygous); R, recessive.

Colors in parentheses are recessive; without a ? means observed, with a ? means hypothetical. Quotation marks means doubt if the term is used with precision. Double query, doubt as to correctness of color assigned.

It remains to consider the behavior of gray in inheritance. Upon tabulating the crosses of blue with gray we find that gray dominates over blue. This is true, for example, in the Al., Bu., He., Lu., McC., Ri., Va. and Wal. pedigrees given in the Appendix. In families where blue × gray parents have a blue-eyed child (Br., Oa., Vo. families) the gray is doubtless heterogametous, containing recessive blue. Again, when both parents are gray-eyed they have produced 9 gray-eyed to 2 blue-eyed children—indicating that both grays are DR (containing recessive blue) expectation being three gray to one blue. Consequently, gray or partial pigmentation is dominant over the pigmentless blue and the occasional enumeration (Ma. family) of descendant of two blue-eyed parents as "blue-gray" or "gray" is due to a slight inaccuracy of classification. On the other hand, gray is recessive to brown (La. family), *i. e.*, a slight pigmentation to an extensive one.

The facts brought out by these statistics show, first, that there are two principal classes of eye-color—brown and blue: that brown varies in intensity from black to light brown; that blue or absence of pigment varies from pale to deep; that blue is frequently imperfect owing to the presence of specks or patches of pigment—the "gray" or "hazel" color; that blue is recessive to gray and gray is recessive to brown.

The practical applications of these results to human marriage are as follows: Two blue-eyed parents will have only blue-eyed children; two gray-eyed parents will have only blue-eyed and gray-eyed but not brown- or black-eyed children; brown-eyed parents may have children with any of the colors of eyes. Gray and blue-eyed parents will tend to have either gray-eyed children only or an equal number of gray- and of blue-eyed children according as the gray-eyed parent is homozygous or heterozygous. When one parent has blue eyes and the other brown the children will be all brown-eyed, if the brown-eyed parent is homozygous—otherwise they will have eyes of various colors according to the gametic constitution of the brown-eyed parent. In case one parent has gray eyes and the other brown we may have the following cases in the offspring: all of them brown-eyed (dark parent homozygous); 50 per cent. gray and 50 per cent. brown (brown parent heterozygous in gray or blue); 25 per cent. blue, 25 per cent. gray and 50 per cent. brown (both parents containing recessive blue germ-cells).

Gertrude C. Davenport
Charles B. Davenport

The Nomenclature of Dextral, Sinistral and Attentional Organs and Functions

In the *Popular Science Monthly*, August, 1904 (republished in *Biographic Clinics*, Vol. III.), I made some suggestions as to the nomenclature of the organs and functions